Müller, in a cigar-box, and therefore the animal had existed for some months without water. How, then, had it lived? It appears to me that the animal had breathed atmospheric air by the right side of its pulmonary chamber, which the researches of Jourdain and Sabatier have shown to be vascularized, but had died on account of having received no help from the left side of the pulmonary chamber, which contains a ctenidium. The fact that a *Helix punctata* which Mr. George also brought over in the same box was alive until yesterday, when I dissected it, shows, I think, that *Ampullaria*, though amphibious, cannot exist out of water for a lengthened period of time.

Note.—Since sending the above to press I find that the name I propose has been preoccupied by Lamarck. I therefore, in its place, suggest for it the name of *Ampullaria Georgii*, after the gentleman who found it and sent it to me.—J. W. W.

VI.—Pentacrini *in peculiar Beds of Great Oolite Age near Basle.* By F. A. Bather, B.A., Assistant in the British Museum (Natural History).

A memoir entitled 'Description des Fossiles de la Grande Oolithe des environs de Bâle,' by Mons. Édouard Greppin, and consisting of 137 pages of text, with ten plates, was published early this year in the 'Mémoires de la Société Paléontologique Suisse,' vol. xv. (1888), at Basle and Geneva. M. Greppin, whose collection I had the pleasure of working through last summer at Basle, kindly gave me for examination some stem-joints of *Pentacrinus* which were new to me. He has printed in his memoir (pp. 133, 134) extracts from the letter that I wrote him anent these specimens; my drawings, however, he was unable to reproduce. To found a species on stem-fragments is, though good may come, to do evil; but to describe a new form without adequate illustration is utterly condemnable. I hasten therefore to complete the description by the accompanying figures, and at the same time would wish to borrow from M. Greppin's work such an account of the rock and of the associated fossils as may invest with interest an otherwise dry communication.

The Great Oolite is the most developed constituent of the

Bathonian in the canton of Basle and reaches a thickness of 40 metres. It consists mainly of an oolitic freestone very poor in fossils, and these, even in the more fossiliferous lower beds, are much worn. Little attention therefore has been paid to it by geologists. M. Greppin, however, has discovered among the lower beds, which correspond more exactly with our Great Oolite, thin lenticular bands of organic *débris*. By heating fragments to a high temperature and dropping them into cold water he split up the calcareous cement and extracted the shells in the beautiful condition shown by his illustrations. These bands are due to depressions in the original sea-floor, which became filled with shells. One would naturally suppose that this was caused by the action of currents after the death of the animals. M. Greppin notes, however, that, while the genus *Cerithium* is most abundant at Muttenz, at Bubendorf, 3 kilometres distant, it is replaced by *Emarginula* and *Rimula* on the same horizon. He therefore considers that the animals lived where their remains are now found. The truth probably lies between the two opinions.

As the result of his researches M. Greppin recognizes 154 species, of which 30 are new; some score remain to be determined when better material shall have been found. Gastropoda are in the majority with 79 species; of these 24 are new; of the rest 39 are found also in England, and 8 of these were previously unrecorded out of Britain. The Lamellibranchiata are represented by 59 species, 10 of which are described for the first time; of the 49 that remain 41 are known in England, 8 of them being hitherto unknown elsewhere. The Cephalopoda are practically absent, the only example being an ill-preserved Belemnite referred to *Hastites fusiformis*. The Brachiopoda, though only of 5 species, are extremely numerous in certain parts, especially *Terebratula maxillata*. Fragments of a *Glyphea ornata* are all the Crustacean remains. Two species of *Serpula* are recognized. Fragments of Echinoidea may be referred to 5 known species, while the Crinoidea number 2 species.

This fauna, as M. Greppin points out, is more akin to the Great-Oolite fauna of England than to that of other foreign countries. This may indeed be due to the fact that the beds of Basle are more exactly synchronous (or should we say homotaxial?) with those worked by Morris and Lycett, than are those continental beds which have hitherto afforded the most numerous fossils.

Perhaps the most interesting character of this fauna is the

small size of its constituents. The Gastropods are rarely more than 1 centimetre in length, and *Terebratula maxillata* averages 3 millimetres. These fossils are true dwarfs, not merely young forms; the stunting of growth is accompanied by no other change of character. It is, however, noticeable that the dwarfs are confined to the lenticular fossil masses; the same species when found, as a few of them are, in the freestone courses are of normal size. Some species are confined to the freestone and are never found as dwarfs.

The difficulty of figuring these minute fossils was overcome by M. Greppin in an ingenious manner, which he was good enough to explain to me. A fossil was fixed between wire points in the field of a microscope and its shadow thrown by a strong light on to a piece of ground glass. On this the outline was traced by a pencil. The object was then examined by reflected light in the usual way, and the details filled in on the glass; any error can be rectified in a moment on this surface. When the glass was filled with drawings it was photographed and phototype plates then made. This method combines accuracy, clearness, and softness, with the great advantage of the author being his own artist.

The Crinoid stem-fragments, to which I would now direct attention, are found by hundreds at both Muttenz and Bubendorf, and are often slightly worn. They share the stunted character of the other fossils, and appear to be the dwarf varieties of two species.

Of these species one is already known as *Pentacrinus Nicoleti*, Desor. The greatest diameter of the stem in the present specimens (5 millim.) is, however, less than the smallest diameter yet recorded for *P. Nicoleti*, and the majority of the fragments have a diameter of only 3 or 4 millimetres. I have therefore suggested that they should be known as *P. Nicoleti*, var. *minimus* (fig. 1, p. 52). Examples of this variety, found in the Great Oolite of Neue Welt by Mons. J. B. Greppin, were seen by me last year in the Strassburg Museum (Elsass-Lothringen Sammlung). The fragments of this species are distinguished by the re-entrant angle of the lateral faces, and by the depression of the sutures at the angles, from the other fragments found in the lenticular beds of Muttenz.

Of what species this other *Pentacrinus* is the dwarf I do not know. I can find nothing exactly like it among Jurassic species, and this, combined with its small size, has induced me to designate it *Pentacrinus Basileæ* (from *Basilea*, Basle) (fig. 2).

Those who think such name-giving unsafe and worse than needless will perhaps excuse me when they learn that in the general collection of the Basle Museum there are similar fragments labelled "*Pentacr. tuberculatus*, Desor, Terrain à chailles, Kl. Basel," and that to this M. de Loriol has added in MS.: "Ce *Pentacrinus* me paraît app. à une espèce nouvelle très-voisine du *P. subsulcatus*, Münster, du Lias : ce dernier n'a pas de creux sur les sutures. Comme il n'y a ni localité ni niveau indiqué, je m'abstiens de la décrire." The stems are pentagonal and basaltiform ; the stem-joints equal one another in height and diameter. The angles are well marked, but there is no reentrant angle. The sutures are depressed on the lateral faces, but not on the angles ; thus there is a ridge on each face of the joint between the angles. This gives the stem its characteristic scalariform appearance. The surface is otherwise smooth. The crenulations, which form a rosette on the articular surface, are only visible on the exterior at the angles ; this is owing to the depression of the suture on the intervening face. The diameter is slight, varying from ·9 to 2·5 millimetres in different specimens.

It should perhaps be noted that M. de Loriol has figured as *Pentacr. crista-galli*, Quenst., some small stem-fragments from the lower beds (Bajocien) of Muttenz, in the collection of M. E. Greppin *. These figures bear some resemblance to the present species. *P. Basileæ* may be descended from *P. crista-galli*, but it is certainly not identical.

Fig. 1. Fig. 2.

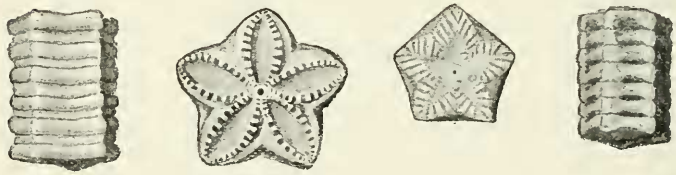

Fig. 1.—*Pentacrinus Nicoleti*, var. *minimus*, from Great Oolite of Muttenz, near Basle ; in British Museum [E. 5505] ; × 4 diam. *a*, side view ; *b*, articular surface.

Fig. 2.—*Pentacrinus Basileæ*, Great Oolite, Muttenz ; Brit. Mus. [E. 5506] ; × 6 diam. *a*, articular surface, rather worn ; *b*, side view, the crenulation of the suture at the angle has not been copied well by the engraving process.

* Monogr. des Crinoïdes fossiles de la Suisse, pl. xv. figs. 29 and 30, *vide* p. 136 ; in Mém. Soc. pal. Suisse, vol. vi. (Basle and Geneva, 1879).